

## Information Sheet: Proposed Biological Research Activity

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### PROPOSED BIOLOGICAL RESEARCH

Los Alamos National Laboratory has developed unique capabilities for analyzing microbes and is applying these capabilities in support of national security and in collaborative work with the New Mexico Department of Health and University of New Mexico School of Medicine.

To augment this research, and in keeping with safe work practices as defined by the Centers for Disease Control and Prevention, the Laboratory may establish a new, room-sized biological containment laboratory for working on samples potentially containing microbial pathogens. Proceeding with this plan awaits a final decision by Laboratory management.

The laboratory will provide protection at Biosafety Containment Level 3, as defined by the CDC. BL-3 facilities exist at most hospitals and all medical and veterinary schools. More than 40 exist on the University of California's nine campuses and the University of New Mexico supports two.

Successful completion of an environmental review according to National Environmental Policy Act protocol and authorization by the CDC must be in hand before any work could be performed in the laboratory.

### PURPOSE OF LABORATORY

The new laboratory, to be established in a 230-square-foot room in a refurbished building at Technical Area 54, will provide additional protection to researchers who handle biological samples. It will also prevent the samples from becoming contaminated by pathogens that occur naturally in the environment.

With BL-3 operational criteria in place, Los Alamos researchers can better apply their highly sensitive DNA-based analytical techniques to identify bacteria, viruses and their remnants in medical, forensic and environmental samples.

Federal agencies have turned to Los Alamos for assistance in analyzing DNA from samples to determine whether, for instance, pathogens present in the samples arose from natural causes or from human releases. The increasing global risk of terrorist use of biological agents heightens the need for efficient and accurate detection techniques and advanced forensic methods for pinpointing the origin of infectious sources.

Los Alamos researchers used these techniques recently to confirm that Russians who died of an anthrax outbreak in 1979 were infected with multiple strains of anthrax; natural outbreaks of anthrax consist of a single strain. The researchers have also pinpointed the geographical origin of anthrax outbreaks in Norwegian and Australian cattle.

These same techniques have immediate applications in medical diagnostics and would support increased collaborations with UNM investigators, especially with regard to diseases of concern to New Mexico such as plague, Hantavirus and arising unexplained illnesses.

To date, Los Alamos has not handled samples directly but has analyzed DNA from samples. The ability to process

samples locally will help improve detection sensitivity, response time and the accuracy of the analysis.

### WHAT THE RESEARCH WON'T INVOLVE

The proposed activity will not involve the production or weaponization of biological agents. In addition, no animals will be used in any of the work conducted in the proposed laboratory.

### MINIMAL RISK TO WORKERS, PUBLIC

The new biological laboratory, operating within proven and well-defined CDC safety guidelines, will allow Los Alamos scientists to work with samples directly at minimum risk to themselves and to the environment.

BL-3 facility workers are trained and certified by the CDC. As a precaution, workers receive vaccinations against known bacteria they might encounter. However, the required protective clothing at the BL-3 level is limited to disposable gloves, safety glasses and lab coats. (BL-4 level protection, used for example at CDC headquarters, uses pressurized body suits.)

The samples Los Alamos would receive -- typically on the order of a teaspoon or less of material -- would be shipped by either the U.S. Postal Service or a commercial overnight service in a triple-containment package approved by the CDC and U.S. Department of Agriculture.

Soils taken from most any backyard would show tiny quantities of various pathogens, such as those causing botulism, anthrax or plague. Only sensitive analytical techniques such as those developed at Los Alamos can identify variants of naturally occurring organisms that would point to a suspicious origin.

Samples are stored frozen and researchers handle them within a biological containment hood, a fixture atop a workbench. The hood ventilation system draws air through a series of filters before the air is exhausted outside.

The samples handled in the hood are small enough that even if all the material were released into the laboratory at once, the risk of infection to workers would be exceedingly small -- just as physicians typically do not contract diseases from patients.

For people outside the facility the risk of infection is even smaller. In the unlikely event that any material escaped the filtration system and was released outside, it would rapidly disperse, and remain well below the minimum level of particles needed to cause an infection, even at the release point.

After researchers have cultured samples in petri dishes or flasks, they kill the microbes and extract and analyze their genetic material to identify the organisms and determine the lineage of any disease-causing agents present. The equipment used and remaining sample material is sterilized by heat. Waste from the facility will be disinfected and certified pathogen-free on site prior to leaving the facility and will be disposed of according to local, state or federal regulations.

**A document detailing the CDC's BL-3 procedures is available on request (505-665-4400)**